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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

GAKH, YELENA G

ART UNIT

PAPER NUMBER

1743

DATE MAILED: 10/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/595,583	Applicant(s) MIZE ET AL.	
	Examiner Yelena G. Gakh	Art Unit 1743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8, 14-44 and 59 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8, 14-44, 59 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

1. Amendment, filed on 09/24/03, is acknowledged. Claims 9-13 are cancelled. Claims 1-8, 14-44 and 59 are pending in the Application.

Response to Amendment

2. Rejections of claims 1-8 and 59 under 35 U.S.C. 112, second paragraph are withdrawn in view of the amendment.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1 and 3-8 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the method utilizing a liquid, does not reasonably provide enablement for the method utilizing a gas. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. The specification specifically discloses that "surface 155 can appear gray under the microscope within the region 150 where solution 114 has passed through filter 122" (page 17, lines 20-22). This statement can be unambiguously interpreted as the following: the substrate of claim 1 changes shade upon getting wet with the solution, with the shade disappearing when the substrate is dried. The only case when such changing of the substrate shade can occur, as disclosed in the specification, is when the fluid comprising particulates is a liquid. No assumption that such change in the shade may occur if the fluid is a gas, which does not leave any traces on the substrate, is presented in the specification. The specification does not enable anyone of ordinary skill in the art to achieve changing of the shade when using gas as the medium for the particulates.

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5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

6. Claims 14-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 recites obtaining two data sets from two different portions of the composition. It is not clear from the claim the way it is written, how it is possible to “depth profile” the composition, if the portions are taken, for example, from the same surface of the composite material.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

8. **Claims 1-2, 4 and 7** rejected under 35 U.S.C. 102(e) as being anticipated by Pavate et al. (US 6,001,227, IDS).

Pavate discloses a method of generating information about particulates present in a fluid by providing a substrate comprising a first shade; filtering the fluid through the substrate with the particulates retained on the substrate, thus providing a second shade; after filtering scanning

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across at least a portion of the **gridded** substrate using **optical [light] microscopy/SEM analysis**, with SEM being scanning electronic microscope, which gives digital images upon scanning of the substrate along the grid; the images are formed due to the contrast of two or more particulates relative to the substrate background. The information obtained is related to size, shape and distribution of particulates as a typical information on morphology obtained by SEM analysis. The contrast of the particles relative to the substrate background is due to response of particulates either to photons (light microscopy) or electrons (SEM). Pavate also indicates that "the inclusion size distribution *may be* determined using manual light microscopy techniques such as, ASTM F24 and F25"; however, disclosed SEM analysis inherently implicates the features of the method described above (col.2, lines 45-50).

Particularly, Pavate discloses measuring inclusion content of aluminum/copper targets by partially dissolving a sample target in HCl/HNO₃, filtering the solution through the substrate and determining the content of the undissolved inclusions, such as **metal oxides** (Al₂O₃), nitride precipitates, **carbide** precipitates by optical microscope/SEM analysis. The **silicon** content should be less than 1% by weight (col. 11, lines 38, 39). Filtering the solution through the gridded substrate (filter) leads to locating undissolved particulates along the grid.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate.

Pavate does not specifically disclose filtering a gas comprising particulates instead of a liquid, as recited in claim 3; however, it would have been obvious for anyone of ordinary skills in the art to use gas comprising particulates instead of liquid in Pavate's method, because the gas plays the same role of a carrier for the particulates as the liquid in this method.

13. **Claims 5-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Woodward et al. (US 5,494,743).

Pavate does not specifically disclose generating information about at least two different types of particulates based on their different relative contrast, e.g. those containing more carbon or oxygen, and determining their concentration.

Woodward discloses antireflection coatings for carbon-based polymer substrates, comprising inorganic metal compounds, including metal oxides, having index of refraction greater than that of the substrate, which results in a contrast image obtained by light microscope (Abstract and Fig. 8).

It would have been obvious for anyone of ordinary skill to apply conventional knowledge of a difference of refractive indices of carbon- and oxygen-containing compounds, which results in relative contrasts of these compounds in light microscopy, as demonstrated by Woodward, to Pavate's method and calculate their content (concentration), because this gives information about the amount of particulates depending on their type, rather than just their sizes, which obviously expands the application of Pavate's method.

14. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Woodward as applied to claims 5-6 above, and further in view of Dewey (US 3,674,926).

Pavate in view of Woodward do not specifically disclose sorting particulates according to their lighter or darker shade relative to the substrate.

Dewey discloses "feature counter with improved masking and grey level detection" in scanning microscope, wherein the counter groups the particulates according to their lighter or darker shade relative to the background or wherein the grey level can be optimized, so that their "light absorbing properties" are changed (Abstract, col. 1).

It would have been obvious for anyone of ordinary skill to modify Pavate-Woodward's method by implementing Dewey's counter, which can count separately particulates with lighter and darker shade than the background, because this makes counting different types of particulates more accurate and straightforward.

15. **Claim 14-17, 21-30, 33 and 34** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Meisburger et al. (US 5,502,306).

Pavate discloses a method of generating information about materials present in a composition by providing a composition (a sputtering target); utilizing a reagent (HCl/HNO₃) to dissolve at least a portion of the composition; filtering the mixture through a substrate (filter) with undissolved material retained on the substrate, the material related to the oxide content (Al₂O₃) and carbon content (carbide); scanning across the substrate with light microscope or SEM; obtaining digital image to obtain information on the content of the particulates based on their contrast relative to the substrate.

Pavate does not specifically disclose scanning across the substrate by automated displacement of the substrate relative to an observing portion of the microscope along a grid pattern.

Meisburger teaches electron beam inspection system and method comprising automated displacement of the substrate relative to the observing portion of the microscope.

It would have been obvious for anyone of ordinary skills in the art to use automated microscope of Meisburger, comprising means for automated displacement of the substrate relative to the observing part of the microscope, in Pavate's method, because this facilitates observing different portions of the substrate and make counting the particulates more efficient.

Pavate in view Meisburger do not specifically disclose "depth profiling the composition", in other words, determining its homogeneity, by comparing data of microscopic analysis obtained for two different parts of the composition sample, as recited in claim 14; however, it would have been obvious for anyone of ordinary skills in the art to do so, because the homogeneity of the sputtering targets is one of their quality parameters. All other limitations of the above-mentioned claims are disclosed in Pavate, as indicated in paragraph 5. For example, determining the content of the undissolved inclusions, indicated by Pavate, is equivalent to determining their concentration; using the same solvents and targets containing the same impurities, e.g. carbide, metal oxides, silicon, as Pavate, inherently leads to the dissolving metals in the solvent, making the silicon passed through the substrate and leaving particulates, including metals oxides on the substrate (filter). Pavate specifically discloses targets comprising aluminum and copper.

16. **Claims 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Meisburger, as applied to claims 14-17, 21-30, 33 and 34 above, and further in view of Woodward.

Pavate in view of Meisburger do not specifically disclose generating information about at least two different types of particulates based on their different relative contrast, e.g. those containing more carbon or oxygen, and determining their concentration.

Woodward discloses obtaining contrast images of metal oxides relative to carbon-based polymer substrates by light microscopy, based on difference in their refractive indices (Abstract and Fig. 8).

It would have been obvious for anyone of ordinary skill to apply conventional knowledge of a difference of refractive indices of carbon- and oxygen-containing compounds, which results in relative contrasts of these compounds in light microscopy, as demonstrated by Woodward, to Pavate-Meisburger's method and calculate their content (concentration), because this gives information about the amount of particulates depending on their type, rather than just their sizes, which obviously expands the application of Pavate-Meisburger's method.

17. **Claims 31 and 32** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Meisburger, as applied to claims 14-17, 21-30, 33 and 34 above, and further in view of International Advanced Materials (IAM).

Pavate in view of Meisburger do not specifically disclose targets comprising silver or lead.

IAM discloses various sputtering target materials, including silver and lead.

It would have been obvious for anyone of ordinary skills in the art to apply Pavate-Meisburger's method to the sputtering targets comprising silver or lead, such as disclosed by IAM, because they belong to the same class of targets and require the same quality control as the targets disclosed by Pavate.

18. **Claims 35-36, 38-39 and 59** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Woodward, Dewey and International Advanced Materials (IAM).

Pavate discloses a method of generating information about materials present in a composition by providing a composition (a sputtering target); utilizing a reagent (HCl/HNO_3) to dissolve at least a portion of the composition; filtering the mixture through a substrate (filter) with undissolved components retained on the substrate, the components being of at least two types – metal oxides (Al_2O_3) and carbides; scanning across the substrate with light microscope or SEM; obtaining digital image to obtain information on the content of the particulates based on their contrast relative to the substrate.

Pavate does not specify that the two types – metal oxides and carbides – give different shade relative to the background and each other.

Woodward teaches obtaining contrast images of metal oxides relative to carbon-containing polymers by light microscopy, based on their different indices of refraction.

It would have been obvious for anyone of ordinary skill to apply conventional knowledge of a difference of refractive indices of carbon- and oxygen-containing compounds, which results in relative contrasts of these compounds in light microscopy, as demonstrated by Woodward, to Pavate's method, because this gives information about the content of retained components of different types, i.e. with different oxide or carbon content.

Pavate in view of Woodward do not specifically disclose that one type of undissolved components being darker than the background and the other being lighter than the background.

Dewey discloses "feature counter with improved masking and grey level detection" in scanning microscope, wherein the counter groups the particulates according to their lighter or

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darker shade relative to the background or wherein the grey level can be optimized, so that their "light absorbing properties" are changed (Abstract, col. 1).

It would have been obvious for anyone of ordinary skill to modify Pavate-Woodward's method by implementing Dewey's counter, which can count separately particulates with lighter and darker shade than the background, because this makes counting different types of particulates more accurate and straightforward.

Pavate in view of Woodward and Dewey do not disclose compositions comprising at least one of Sb, Pb and Sn.

IAM discloses sputtering targets comprising Sb, Pb or Sn.

It would have been obvious for anyone of ordinary skills in the art to apply Pavate-Woodward-Dewey's method to IAM's targets, because they belong to the same class of sputtering targets as Pavate's compositions and are the subjects of the same quality control as the targets disclosed by Pavate.

19. **Claim 37** is rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Woodward, Dewey and IAM, as applied to claims 35-36, 38-39 and 59 above, and further in view Kitamura.

Pavate in view of Woodward, Dewey and IAM does not particularly disclose displaying results as a histogram.

Kitamura teaches a particle analysis method "performed with a **scanning type electron microscope** which directs a narrow, focused electron beam through an electromagnetic lens onto a surface of a sample mounted on a high precision stage in scanning, produces a detection signal representing intensity of secondary electrons or reflected electrons from the sample surface, and displays a representation of the sample surface based on the detection signal, the method comprising the steps of: reading the image by controlling the **electron microscope** by automatically shifting views produced by scanning the electron beam from a most probable spot where particles may exist to less probable spots in sequence based on information contained in the signal of coordinates of a particle location; determining the particle detection location and acquiring a detection evaluation value in the image, under the assumption that the normal distribution portion of a **histogram** of detection intensity is due to a simple pattern and that the

rest of the distribution of the histogram is due to a particle; and scanning a location where particles are determined to exist based on the result of the determining step" (col. 1, lines 35-58).

It would have been obvious for anyone of ordinary skill to represent the results of Pavate-Woodward-Dewey-IAM's method as a histogram, as taught by Kitamura, because it is a convenient way to represent the content of the composition, obtained by optical microscopy/SEM analysis.

20. **Claims 40-44** are rejected under 35 U.S.C. 103(a) as being unpatentable over Pavate in view of Meisburger, Woodward and Dewey.

Pavate discloses a method of generating information about materials present in a composition by providing a composition (a sputtering target); utilizing a reagent (HCl/HNO₃) to dissolve at least a portion of the composition; filtering the mixture through a substrate (filter) with undissolved impurities retained on the substrate, impurities being of at least two types - metal oxides (Al₂O₃) and carbides, located along the grid on the gridded substrate; scanning across the substrate with light microscope or SEM; obtaining digital image to obtain information on the content of the particulates based on their contrast relative to the substrate.

Pavate does not specifically disclose scanning across the substrate by automated displacement of the substrate relative to an observing portion of the microscope along a grid pattern.

Meisburger teaches electron beam inspection system and method comprising automated displacement of the substrate relative to the observing portion of the microscope (Abstract).

It would have been obvious for anyone of ordinary skills in the art to use automated microscope of Meisburger, comprising means for automated displacement of the substrate relative to the observing part of the microscope, in Pavate's method, because this facilitates observing different portions of the substrate and make counting the particulates more efficient.

Pavate in view of Meisburger do not specifically disclose generating information about at least two different types of impurities, i.e. those containing more carbon or oxygen, based on their different relative contrast.

Woodward teaches obtaining contrast images of metal oxides relative to carbon-containing polymers by light microscopy, based on their different indices of refraction (Abstract and Fig. 8).

It would have been obvious for anyone of ordinary skill to apply conventional knowledge of a difference of refractive indices of carbon- and oxygen-containing compounds, which results in relative contrasts of these compounds in light microscopy, as demonstrated by Woodward, i.e. giving lighter and darker shade relative to the contrast, to Pavate-Meisburger's method and calculate their content (concentration), because this gives information about the amount of particulates depending on their type, rather than just their sizes, which obviously expands the application of Pavate-Meisburger's method.

Pavate in view of Meisburger and Woodward do not specifically disclose modifying a light absorbing property of at least some of the impurities on the substrate and obtaining data on relative darkness of the impurities, one type being darker and the other – lighter than the substrate.

Dewey discloses "feature counter with improved masking and grey level detection" in scanning microscope, wherein the counter groups the particulates according to their lighter or darker shade relative to the background and wherein the grey level can be optimized, so that their "light absorbing properties" are changed (Abstract, col. 1).

It would have been obvious for anyone of ordinary skill to modify Pavate- Meisburger- Woodward's method by implementing Dewey's counter, which can optimize the grey level (changing "light absorbing properties" of the impurities), so that the particulates with different reflection indices will appear as darker and lighter than the background, because this makes analysis of different types of impurities more accurate and straightforward.

Response to Arguments

21. Applicant's arguments filed 09/24/03 have been fully considered but they are not persuasive. Regarding Pavate's anticipatory prior art, Pavate discloses the same method as recited in claims 1, 2-4 and 7; changing the shade of the substrate upon filtering a solution through it is an intrinsic feature of the process. The disclosure does not enable anyone of ordinary skill in the art to obtain such changing of the shade when the fluid is gas, and such embodiment is not considered in the specification. Regarding the arguments on rejections of claims 14-17, 21-30, 33 and 34, the examiner did not quite understand, which of the statement is

not obvious – that the homogeneity of the target is important for the quality of the sputtering targets? If the Applicants consider this statement not obvious, the examiner is ready to provide a plethora of references where such statement can be found. Regarding the arguments on rejections of claims 35-36, 38-39 and 59 – they are just unclear. Pavate specifically discloses dissolving the target with undissolved portion containing at least two types of compounds – Al_2O_3 and carbides. It is absolutely obvious for anyone of ordinary skill in the art that the nature of undissolved compounds depend on the type of the sputtering targets used, and if these targets contain Sb, Pb or Sn instead of Al, that is what will be left as an undissolved material. The solvents can be the same as disclosed by Pavate, or slightly modified, which in the scope of the skill of any routineer in the art. Thus, the material retained on the substrate is not defined by the method. As for the last group of claims, 40-44, Dewey specifically teach gray level optimization of the image; the Applicants have not referred to this reference, and therefore their arguments are moot.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (703) 306-5906. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (703) 308-4037. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Yelena G. Gakh
10/13/03


Jill Warden
Supervisory Patent Examiner
Technology Center 1700